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MAJ DE JONG MARLA J

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ANXIETY IS NOT MANIFESTED BY ELEVATED HEART RATE AND BLOOD PRESSURE IN ACUTELY ILL CARDIAC PATIENTS

Marla J. De Jong, RN, MS, CCNS, CCRN, CEN, Major; University of Kentucky
Debra K. Moser, DNSc, RN, FAAN; University of Kentucky
Kyungeh An, PhD, RN; Ewha Women's University
Misook L. Chung, PhD, RN; University of Kentucky
518 CON / HSLC Building, Lexington, KY 40536-0232

Key Words: Heart disease, heart rate, blood pressure, anxiety

Purpose: Patients with acute myocardial infarction and heart failure are often anxious. Anxiety after acute myocardial infarction may cause in-hospital complications and increased mortality. Clinicians often use heart rate and blood pressure as indicators of anxiety; however, little is known about whether these measures accurately reflect anxiety in acutely ill patients. The purpose of this study was to determine whether heart rate and blood pressure were related to level of anxiety at the time of measurement in patients with chronic advanced heart failure, patients with acute myocardial infarction, and healthy individuals.

Method: For purposes of this descriptive, correlational investigation, we combined data from two studies: 1) study of anxiety among patients experiencing acute myocardial infarction and 2) study of the impact of a biofeedback-relaxation intervention in patients with heart failure. Anxiety, heart rate, and blood pressure were measured in the same manner in each group of participants. State anxiety was measured in all participants using the anxiety subscale of the Brief Symptom Inventory. Heart rate and blood pressure data were collected immediately prior to the anxiety assessment.

Findings: There were no correlations between anxiety and heart rate or diastolic blood pressure. Higher anxiety was associated with lower systolic blood pressure in patients with acute myocardial infarction ($r = -.23$, $p < .05$) and in healthy individuals ($r = -.27$, $p < .05$). Mean systolic blood pressure, diastolic blood pressure, and heart rate were similar for patients in high and low anxiety subgroups among all types of patients.

Discussion: Elevated heart rate and blood pressure do not accurately reflect level of anxiety as reported by patients with heart failure or acute myocardial infarction and by healthy individuals, and thus cannot be used to assess anxiety in acutely ill patients. Clinicians who use changes in heart rate or blood pressure as indicators of anxiety may fail to recognize and treat anxiety, placing their patients at high risk for both immediate and long-term complications.

ANXIETY IS NOT MANIFESTED BY ELEVATED HEART RATE AND BLOOD PRESSURE IN ACUTELY ILL CARDIAC PATIENTS

Marla J. De Jong, RN, MS[1], Debra K. Moser RN, DNSc, FAAN[1],
Kyungeh An, RN, PhD[2], Misook L. Chung, RN, PhD[1]
[1] University of Kentucky, [2] Ewha Women's University

Background and Significance

- Patients with acute myocardial infarction (AMI) and heart failure (HF) are often anxious. 10-26% of hospitalized persons with AMI are more anxious than individuals with a psychiatric disorder.
- Anxiety after AMI may cause in-hospital complications and increased mortality. For example, AMI patients with high state anxiety were 4.9 times more likely to develop in-hospital complications including ventricular tachycardia, ventricular fibrillation, ischemia, and reinfarction.
- Clinicians often fail to assess anxiety and when they do assess for anxiety they use their clinical judgment to assess anxiety rather than a valid and reliable instrument that is designed to measure anxiety.
- Critical care nurses commonly use increased heart rate (HR) and increased blood pressure (BP) as important indicators of anxiety. However, these indicators may not be useful when assessing acutely ill patients. Medications, such as beta blockers, affect HR and BP. It is difficult to differentiate whether HR and BP changes are due to anxiety or a deterioration in the patient's physiologic status.
- Little is known about whether HR and BP accurately reflect anxiety in acutely ill patients.

Purpose

- The purpose of this study was to determine whether HR and BP were related to level of anxiety at the time of measurement in patients with 1) chronic advanced HF, 2) patients with AMI, and 3) healthy individuals.

Methods

Design

- This was a descriptive, correlational study using data from two previous studies: 1) study of anxiety among patients experiencing AMI and 2) study of the impact of a biofeedback-relaxation intervention in patients with HF and healthy individuals.

Sample Inclusion Criteria

- AMI patients: 1) diagnosis of AMI by typical electrocardiogram and enzyme level changes, 2) pain-free and hemodynamically stable at the time of the interview which occurred within 72 hours of admission.
- HF patients: 1) New York Heart Association class II to IV HF, 2) no recent (within 6 months) AMI, 3) enrolled in outpatient HF clinic.

- Healthy individuals: no history of heart disease, diabetes, or other major illness.
- All patients were cognitively able to participate in a short interview, were free of serious, debilitating co-morbidities, and spoke English.

Instruments

- Anxiety, HR, and BP were measured in the same manner in each group of participants.
- The Brief Symptom Inventory: This six-item anxiety subscale is especially useful when studying acutely ill patients because it is sensitive, brief, reliable and valid, and does not rely on clinical symptoms to indicate feelings of anxiety. For each of the items on the scale, patients rate their level of distress from 0 ("not at all") to 4 ("extremely"). The scores are summed and averaged. The averaged score reflects the patient's overall level of state anxiety.
- Heart Rate and Blood Pressure: HR and BP data were collected using two methods to establish the validity of the measurement. The same methods were used for participants from both studies. Heart rate and BP data were collected immediately prior to the anxiety assessment.

Analysis

- Correlation coefficients were computed between the mean anxiety level of each group and HR, systolic BP, and diastolic BP.
- We also subdivided each of the three groups into a "high anxiety group" and a "low anxiety group" based on the median split of the anxiety scores. We performed two-tailed t tests to evaluate whether the high and low anxiety groups manifested differences in mean HR, systolic BP, and diastolic BP at the time of measurement.

Results

- Sample Characteristics: 117 patients composed of 32 (27.4%) patients with HF, 54 (46.1%) patients with AMI, and 31 (26.5%) healthy individuals (Table 1).
- *Anxiety*: Mean anxiety scores for the AMI, HF, and healthy groups were .52, .98, and .58, respectively, which in each group is substantially greater than the norm referenced anxiety level of 0.35 ± 0.45. 62.5% of patients with HF, 38.8% of patients with AMI, and 54.9% of healthy individuals reported higher anxiety than the norm reference.
- *Relationship Between Anxiety and Physiologic Variables*: There were no correlations between anxiety and HR or diastolic BP. There were only two significant correlations (Table 2). Higher anxiety was associated with lower systolic blood pressure in healthy individuals ($r = -.27, p < .05$) and patients with AMI ($r = -.23, p < .05$).
- Mean systolic BP, diastolic BP, and HR were similar for patients in the high and low anxiety subgroups regardless of the presence or absence of CHD (Table 3).

Conclusions

- Elevated HR and BP do not accurately reflect level of anxiety as reported by patients with AMI or HF and healthy individuals, and thus cannot be used to assess anxiety in acutely ill patients.
- Clinicians who use changes in HR or BP as indicators of anxiety may fail to recognize and treat anxiety, placing their patients at high risk for both immediate and long-term complications.
- To facilitate an accurate assessment of anxiety, we recommend that clinicians use an anxiety instrument instead of depending on changes in HR and BP.

Limitations
- We measured anxiety at one time point; more research is needed to evaluate whether our findings would persist over time.
- Although healthy individuals had higher than expected levels of anxiety, they still did not manifest an elevated HR or BP.

Table 1 Comparison of selected characteristics

Variable	Entire Sample (N= 117)	HF Group (n = 32)	MI Group (n = 54)	Healthy Group (n = 31)
		M ±SD		
Heart Rate (beats/min)	72.8 ± 12.9	69.5 ± 13.6	76.7 ± 13.2	69.8 ± 9.9
Systolic BP (mm Hg)	122.2 ± 19.2	114.4 ± 16.9	121.1 ± 17.2	131.6 ± 21.2
Diastolic BP (mm Hg)	70.4 ± 16.0	74.3 ± 14.2	60.5 ± 10.4	83.6 ± 14.8
Age (years)	56.8 ± 13.9	53.5 ± 13.3	62.8 ± 14.4	49.3 ± 8.3
Education (years)	13.7 ± 3.1	13.8 ± 1.9	12.4 ± 2.6	16.0 ± 3.8
		N (%)		
Female Gender	70 (59.8)	10 (31.3)	42 (77.8)	18 (58.1)
Married	66 (56.4)	21 (65.6)	32 (59.3)	13 (41.9)
White Ethnicity	93 (79.5)	27 (84.4)	43 (79.6)	23 (74.2)

Table 2 Correlations between anxiety, HR, and BP (*$p < .05$ by Kendall's tau)

Variable	HF Group	MI Group	Healthy Group

	Total Anxiety	Total Anxiety	Total Anxiety
Heart Rate	.26	.11	.07
Systolic BP	.10	−.23*	−.27*
Diastolic BP	.24	−.10	−.25

Table 3 Comparison of mean systolic blood pressure, diastolic blood pressure, and heart rate between high anxiety and low anxiety groups

	High Anxiety Group	Low Anxiety Group	p
HF Group			
Heart rate (beats per minute)	73.9 ± 13.2	65.7 ± 13.2	.09
Systolic BP (mm Hg)	117.9 ± 21.1	111.4 ± 11.8	.28
Diastolic BP(mm Hg)	79.1 ± 13.9	70.0 ± 13.5	.07
AMI Group			
Heart rate (beats per minute)	79.5 ± 13.9	3.4 ± 12.1	.09
Systolic BP (mm Hg)	116.8 ± 14.5	125.1 ± 18.8	.08
Diastolic BP(mm Hg)	59.3 ± 8.7	61.6 ± 11.9	.42
Healthy Group			
Heart rate (beats per minute)	69.9 ± 10.8	69.6 ± 9.0	.95
Systolic BP (mm Hg)	126.0 ± 21.0	138.5 ± 19.9	.10
Diastolic BP(mm Hg)	80.5 ± 16.0	87.4 ± 12.8	.19